

Claims

1. A device for removing soot particles from exhaust of a diesel engine, wherein said device is comprised of a wall-flow filter, and said wall-flow filter is comprised of:
 - (a) inflow channels;
 - (b) outflow channels, wherein said inflow channels are connected to said outflow channels through pores; and
 - (c) exhaust treatment structures, wherein said exhaust treatment structures are located in said inflow channels and/or said outflow channels.
2. The device of claim 1, wherein said inflow channels, said outflow channels, and said exhaust treatment structures are coated with a catalyst layer.
3. The device of claim 1, wherein the wall-flow filter and the exhaust treatment structures are made of a ceramic material.
4. The device of claim 3, wherein said the ceramic material is selected from the group consisting of cordierite, silicon carbide, aluminum oxide, silicon nitride, mullite, and mixtures thereof.
5. The device of claim 4, wherein the exhaust treatment structures extend over the entire length or over partial areas of the inflow channels and/or the outflow channels.
6. The device of claim 5, wherein both the outflow channels and the inflow channels have exhaust treatment structures and the exhaust treatment structures of said inflow channels and said outflow channels are coated with a catalyst layer but the catalyst layer on said exhaust treatment structure of said outflow channels

comprises a different substance than the catalyst layer on said exhaust treatment structure of said inflow channels.

7. The device of claim 1, wherein a plurality of adjacent channels of the wall-flow filter are combined into one inflow channel or one outflow channel, and wherein the combined adjacent channels have channel walls that are located in their interior that form the exhaust treatment structures.
8. The device of claim 2, wherein the catalyst layer comprises an oxidation catalyst.
9. The device of claim 8, wherein the oxidation catalyst comprises a carrier material selected from the group consisting of cerium oxide, cerium/zirconium mixed oxides, praseodymium oxide, aluminum silicate, active aluminum oxide, and mixtures thereof, to which platinum and/or palladium are applied in the form of nanocrystalline particles.
10. The device of claim 9, wherein the catalyst layer comprises a base metal.
11. The device of claim 2, wherein the catalyst layer comprises a catalyst for reducing the nitrogen oxides contained in the exhaust.
12. The device of claim 11, wherein the catalyst layer comprises an SCR catalyst.
13. The device of claim 12, wherein the SCR catalyst comprises V₂O₅, WO₃, or TiO₂, or mixtures of these compounds.
14. The device of claim 2, wherein the catalyst layer comprises components for absorbing nitrogen oxides contained in the exhaust.

15. The device of claim 14, wherein the components for absorbing the nitrogen oxides comprise at least one alkaline-earth metal.
16. The device of claim 15, wherein said alkaline-earth metal is selected from the group consisting of barium, strontium, and calcium.
17. The device of claim 16, wherein the catalyst layer further comprises platinum on activated aluminum oxide.
18. A process for removing soot particles from the exhaust of a diesel engine, said process comprising:
 - (a) exposing an exhaust gas to a wall-flow filter, wherein said wall-flow filter comprises:
 - (i) inflow channels;
 - (ii) outflow channels, wherein said inflow channels and said outflow channels are connected by pores; and
 - (iii) exhaust treatments structures, wherein said exhaust treatment structures are located in said inflow channels and/or in said outflow channels; and
 - (b) causing the exhaust gas to enter the wall-flow filter through said inflow channels and to leave the wall-flow filter through the outflow channels, wherein said inflow channels and said outflow channels are linked by pores, thereby removing soot through the wall-flow filter.